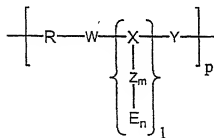


Claims

1. A combination of a carrier and a complex containing one or more nucleic acid molecules and one or more charged copolymers of the general formula I



wherein R is an amphiphilic polymer or a homo- or hetero-bifunctional derivative thereof,

and wherein X

- i) is an amino acid or an amino acid derivative, a peptide or a peptide derivative or a spermine or a spermidine derivative; or
- ii) wherein X is



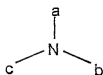
wherein

a is H or, optionally halogen- or dialkylamino-substituted, C₁-C₈ alkyl;

and wherein

b, c and d are the same or different, optionally halogen- or dialkylamino-substituted, C₁-C₈ alkylene; or

iii) wherein X is



wherein

a is H or, optionally halogen or dialkylamino substituted, C₁-C₆ alkyl,

and wherein

b and c are the same or different, optionally halogen- or dialkylamino-substituted, C₁-C₆ alkylene; or

iv) wherein X

is a substituted aromatic compound with three functional groupings W₁Y₁Z₁, wherein W, Y and Z have the meanings mentioned below;

wherein

W, Y or Z have the same or different groups CO, NH, O or S or a linker grouping capable of reacting with SH, OH, NH or NH₂;

and wherein the effector molecule E

is a cationic or anionic peptide derivative or a spermine or spermidine derivative or a glycosaminoglycane or a non-peptidic oligo/polycation or -anion; wherein

m and n are independently of each other 0, 1 or 2; wherein

p preferably is 3 to 20; and wherein

I is 1 to 5, preferably 1.

2. The combination according to claim 1, wherein the amphiphilic polymer of the copolymer is a polyalkylene oxide.
3. The combination according to claim 2, wherein the amphiphilic polymer of the copolymer is a polyalkylene glycol.
4. The combination according to any one of claims 1 to 3, wherein X or E in the copolymer is a charged peptide or peptide derivative.
5. The combination according to any one of claims 1 to 4, wherein a ligand for a higher eukaryotic cell is coupled to the copolymer.
6. The combination according to any one of claims 1 to 5, wherein the nucleic acid molecule(s) is (are) condensed with organic polycation or cationic lipid molecules and the complex formed thereby has one or more charged copolymers of the general formula I bound to its surface via ionic interaction.
7. The combination according to any one of claims 1 to 6, containing a therapeutically effective nucleic acid molecule.
8. The combination according to any one of claims 1 to 7, wherein the carrier consists of a biologically non-resorbable material.
9. The combination according to any one of claims 1 to 7, wherein the carrier consists of a biologically resorbable material.
10. The combination according to claim 9, wherein the biologically resorbable material is collagen.

11. The combination according to claim 10, wherein the carrier is a collagen sponge.
12. The combination according to any one of claims 1 to 7, wherein the carrier is a carrier which is obtainable by cross-linkage of a copolymer as defined in claim 1.
13. Use of a combination according to any one of claims 1 to 12 for the transfer of a nucleic acid into cells.
14. A pharmaceutical composition containing a combination according to any one of claims 1 to 12.
15. A kit containing a carrier and a copolymer or a complex as defined in claim 1.